

Trend Study 17-30-02

Study site name: Spring Canyon.

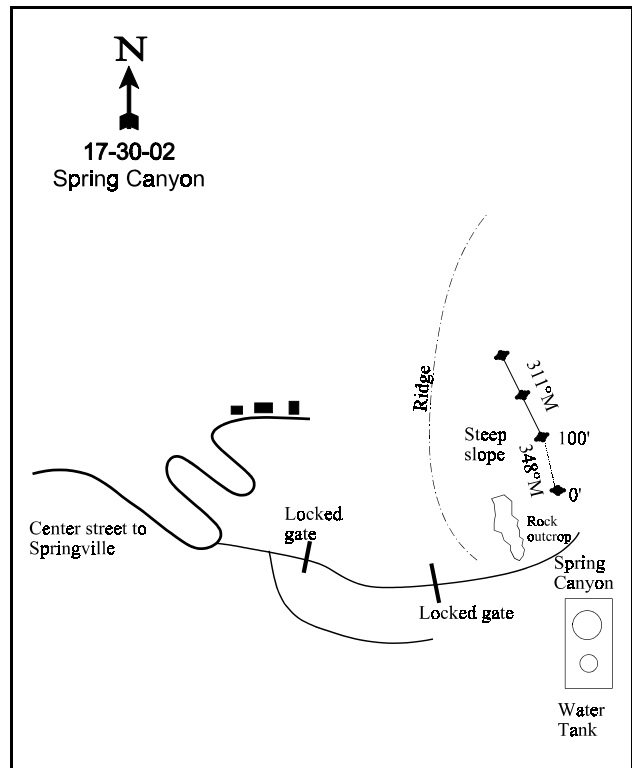
Vegetation type: Stansbury Cliffrose.

Compass bearing: frequency baseline 348 degrees magnetic (line 2-3 @ 311°M).

Frequency belt placement: line 1 (11 & 95ft), line 2 (34 & 71ft), line 3 (59ft). Rebar: belt 1 on 1ft., belt 5 on 1ft.

LOCATION DESCRIPTION

Follow Center Street in Springville easterly toward the mountain. From the first switchback where the main road goes up to houses on the bench north of Spring Canyon, continue towards the canyon mouth to the first gate. Continued development may alter the approach to the canyon. In 1989, you could walk 1/2 mile from the first locked gate to another gate up in the canyon. From this gate, continue 119 paces east up Spring Canyon. Uphill to the northwest (azimuth 271 degrees) there is a conspicuous group of rock outcroppings. Walk up the side hill to the uppermost rock near the top of the ridge. The 0-foot baseline stake, marked with a red browse tag #177, is north of the rock.

Map Name: SpringvilleTownship 7S, Range 3E, Section 35

Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4445799 N 451528 E

DISCUSSION

Spring Canyon - Trend Study No. 17-30

The Spring Canyon study typifies severe winter range on much of herd unit 17, especially that portion located north of Hobble Creek Canyon. This is an area of critical importance but also one which is seriously depleted. This study samples a sparse Stansbury cliffrose community located near the mouth of Spring Canyon. The site lies on a steep (60-65%) south to southwest facing slope at an elevation of 5,200 feet. During the winter, the area is intensively used by deer and increasingly so by elk. Quadrat frequency of deer and elk pellet groups was moderately high at 38% and 22% in 1997 respectively. Frequency of deer pellet groups was similar in 2002 at 32%. Data from a pellet group transect read on site in 2002 estimated 42 deer days use/acre and 3 elk days use/acre (104 ddu/ha and 8 edu/ha). All pellet groups appeared to be from winter use.

Soil condition is poor. The soil is exceptionally loose, rocky, and easily moved down the steep slope. Moisture holding capability would be very low. Soil textural analysis indicates a sandy loam with a neutral soil reaction (pH of 7.0). Both phosphorous and potassium levels are low at 5.9 ppm and 57.6 ppm respectively. Levels less than 10 ppm for phosphorus and 70 ppm for potassium can limit normal plant growth and development. Effective rooting depth was estimated at almost 11 inches with an average temperature of 55.8° F at 12 inches in depth in 1997. Surface rock is variable in size and appears to be limestone. No soil profile or horizon development was detectable. Erosion is unavoidable but little serious erosion is occurring due to the nearly complete cover of rock and vegetation. Most perennial plants are pedestaled. The soil erosion condition class was determined as in 2002.

There is little browse on the site with total shrub cover averaging only about 6% in 1997 and 2002. Stansbury cliffrose is the key browse species. It provided 47% of the meager browse cover in 1997, increasing to 60% in 2002. Cliffrose comprises a scattered population of mostly mature plants. Density was estimated at only 240 plants/acre in 2002. Mature cliffrose averaged about 6 feet in height with a few individuals in excess of 10 feet. Utilization or hedging of the available portions has been heavy since the site was established in 1983. However, vigor has remained good since 1989 and the number of decadent plants was low at 8% in 2002. Due to drought conditions in 2002, annual leader growth for cliffrose was poor averaging less than 1 inch.

Broom snakeweed was abundant and had an estimated density of 2,760 plants/acre in 1997. The population appeared to be expanding with many seedling and young plants encountered. However, due to drought conditions, density declined to only 580 plants/acre in 2002, and just over one-third of the surviving plants displayed poor vigor. A short distance up the canyon, there are a few patches of Gambel oak, netleaf hackberry, and Rocky Mountain smooth sumac.

The perennial grass composition is depleted. Bulbous bluegrass dominates the herbaceous understory as it provided 70% of the total herbaceous understory cover in 1997 and 64% in 2002. Bulbous bluegrass is a poor value, short-lived perennial grass which is a low growing and dries out completely in early summer. Only minimal forage or soil protection is afforded by bulbous bluegrass. Bluebunch wheatgrass is the most desirable grass on the site. Although, it provided only 12% of the total grass cover in 1997, increasing to 15% in 2002. Nested frequency has increased since 1989 to numbers similar to 1983. Cheatgrass, an annual, was encountered in nearly every quadrat in 1997 and 2002. Cover values are low however.

Forb composition is only slightly more diverse than that of grasses. The most abundant species is shortstem wild buckwheat. This plant still exhibits pedestalling with no apparent utilization. Other forbs include Louisiana sage, wavyleaf thistle, and yellow salsify.

1983 APPARENT TREND ASSESSMENT

Range condition is poor and appears to be in a state of decline. The soil, already seriously depleted, suffers from a lack of effective ground cover and is unlikely to stabilize without some form of direct intervention (i.e., terracing, reseeding etc.). Vegetative trend also appears to be in a state of decline. Although the key browse species, Stansbury cliffrose, is long-lived, reproduction is lacking and use is heavy. When this species is gone, nothing with any real value will remain. The site is currently dominated by cheatgrass and bulbous bluegrass, a low value perennial. Drastic remedial action is needed, but not very practical.

1989 TREND ASSESSMENT

In the five years since the study was established, there have been no significant changes in condition on this critical winter range. The data between years is similar. Forage for big game is still limited, and the rehabilitation potential is very low due to the shallow, rocky and dry soil on the very steep 65% slope. The ground cover measurements indicate an increase in rock and pavement cover to 69%. Soil and rock movement is continuous. Trend for soil is stable but in poor condition. Cliffrose displays improved vigor, reproduction, and a 27% increase in density. Trend for browse is considered slightly up. Herbaceous composition is still poor and dominated by the low value perennial, bulbous bluegrass. Trend is down slightly due to a significant decline in the nested frequency of bluebunch wheatgrass. Perennial forbs are still limited and have declined slightly in frequency.

TREND ASSESSMENT

soil - stable (3)

browse - up slightly but limited (4)

herbaceous understory - down slightly (2)

1997 TREND ASSESSMENT

The soil trend is stable, although poor. Erosion will always occur on this slope due to the steepness. Vegetative cover will help slow erosion and there is currently little exposed bare soil. Rock and pavement cover is high, although they may increase erosion potential. Browse trend is stable with Stansbury cliffrose being the key species. Some of the decline in density may be due to the much larger sample used in 1997. Plants are heavily hedged but still exhibit good vigor. Percent decadency has increased, but more seedlings were encountered in 1997. Broom snakeweed could be increasing on the site. Although this species can fluctuate highly between years, it should still be monitored for further increase. The herbaceous trend is up slightly due to a significant increase in the nested frequency of bluebunch wheatgrass and bulbous bluegrass. Species composition remains poor and totally dominated by the low value perennial, bulbous bluegrass.

TREND ASSESSMENT

soil - stable but poor (3)

browse - stable but limited (3)

herbaceous understory - up slightly but poor (4)

2002 TREND ASSESSMENT

Trend for soil remains stable but in poor condition. Rock and pavement provide nearly half of the ground cover on the site. However, vegetation and litter cover, made up mostly of bulbous bluegrass, is abundant leaving little exposed bare ground. Trend for the key browse species, cliffrose, is stable. Density remains similar to 1997 estimates. Utilization is still heavy but vigor remains good and the number of decadent plants has declined from 22% to 8% of the population. Another positive change is the dramatic decline in the invasive broom snakeweed (2,760 plants/acre down to 580). About one-third of the remaining plants display poor vigor. Trend for the herbaceous understory is stable with similar nested frequency values for perennial grasses and forbs. Composition is still poor and dominated by the low value perennial, bulbous bluegrass which provides 69% of the total grass cover or 64% of the total herbaceous cover.

TREND ASSESSMENT

soil - stable but poor (3)

browse - stable but limited (3)

herbaceous understory - stable but poor (3)

HERBACEOUS TRENDS --

Herd unit 17 , Study no: 30

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron spicatum	_b 157	_a 97	_b 162	_b 148	64	45	68	71	3.85	5.75
G	Bromus tectorum (a)	-	-	288	295	-	-	97	94	3.47	6.02
G	Poa bulbosa	_a 294	_a 320	_b 348	_b 345	96	98	98	98	24.68	26.57
G	Poa secunda	-	-	6	1	-	-	3	1	.18	.00
Total for Annual Grasses		0	0	288	295	0	0	97	94	3.47	6.02
Total for Perennial Grasses		451	417	516	494	160	143	169	170	28.73	32.32
Total for Grasses		451	417	804	789	160	143	266	264	32.20	38.35
F	Alyssum alyssoides (a)	-	-	_b 53	_a 17	-	-	24	8	.14	.04
F	Artemisia ludoviciana	39	28	27	29	17	11	13	13	.28	.39
F	Aster spp.	-	-	-	3	-	-	-	1	-	.03
F	Astragalus utahensis	-	-	6	2	-	-	3	1	.06	.03
F	Cirsium undulatum	_{ab} 8	_b 15	_b 16	_a -	3	9	8	-	.59	-
F	Cryptantha spp.	-	-	-	3	-	-	-	1	-	.00
F	Eriogonum brevicaulle	89	64	52	72	36	32	24	31	1.88	2.33
F	Erodium cicutarium (a)	-	-	_a 4	_b 30	-	-	2	15	.01	.17
F	Eriogonum racemosum	-	-	-	1	-	-	-	1	-	.03
F	Gilia spp. (a)	-	-	_a -	_b 14	-	-	-	7	-	.03
F	Heterotheca villosa	-	-	2	-	-	-	1	-	.03	.00
F	Lappula occidentalis (a)	-	-	_a -	_b 17	-	-	-	9	-	.04
F	Lomatium spp.	-	-	2	-	-	-	1	-	.00	-
F	Machaeranthera canescens	-	1	3	-	-	1	2	-	.04	-
F	Penstemon spp.	-	-	3	-	-	-	2	-	.03	-
F	Tragopogon dubius	1	-	1	2	1	-	1	1	.03	.00

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
	Total for Annual Forbs	0	0	57	78	0	0	26	39	0.15	0.29
	Total for Perennial Forbs	137	108	112	112	57	53	55	49	2.97	2.83
	Total for Forbs	137	108	169	190	57	53	81	88	3.12	3.13

Values with different subscript letters are significantly different at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 17 , Study no: 30

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	<i>Celtis reticulata</i>	0	0	.03	.53
B	<i>Chrysothamnus nauseosus albicaulis</i>	1	1	.00	.38
B	<i>Cowania mexicana stansburiana</i>	9	10	2.66	3.34
B	<i>Gutierrezia sarothrae</i>	48	22	1.89	.09
B	<i>Purshia tridentata</i>	0	4	-	.03
B	<i>Quercus gambelii</i>	1	1	1.03	1.23
	Total for Browse	59	38	5.63	5.61

CANOPY COVER --

Herd unit 17 , Study no: 30

Species	Percent Cover	
	'97	'02
<i>Cowania mexicana stansburiana</i>	1.8	3
<i>Quercus gambelii</i>	-	2

Key Browse Annual Leader Growth

Herd unit 17 , Study no: 30

Species	Average leader growth (in) '02
<i>Cowania mexicana stansburiana</i>	0.8

BASIC COVER --

Herd unit 17 , Study no: 30

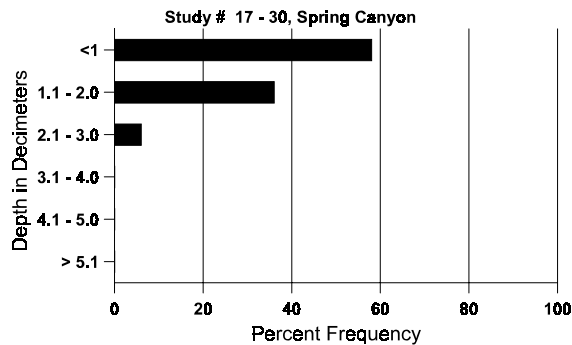
Cover Type	Nested Frequency		Average Cover %			
	'97	'02	'83	'89	'97	'02
Vegetation	369	364	4.50	8.25	39.04	48.04
Rock	311	317	14.00	12.50	13.13	16.63
Pavement	362	356	45.00	56.25	28.82	28.96
Litter	386	348	31.00	14.25	17.02	15.57
Cryptogams	83	-	.75	0	.43	0
Bare Ground	238	176	4.75	8.75	10.95	2.64

SOIL ANALYSIS DATA --

Herd Unit 17, Study no: 30, Spring Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.6	55.8 (12.6)	7.0	61.8	22.4	15.8	2.0	5.87	57.6	.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 17 , Study no: 30

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre 02	Days Use per Acre (ha) 02
Rabbit	-	1	-	-
Elk	22	2	44	3 (8)
Deer	38	32	548	42 (104)

BROWSE CHARACTERISTICS --

Herd unit 17 , Study no: 30

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Celtis reticulata																		
M	'83	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'89	-	1	-	-	-	-	-	-	-	-	1	-	33	46	67	1	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	0	24	104	0	
	'02	-	-	-	-	-	-	-	-	-	-	-	-	0	26	103	0	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
		'83				00%				00%				00%				
		'89				100%				00%				00%				
		'97				00%				00%				00%				
		'02				00%				00%				00%				
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	33		-			
												'97	0		-			
												'02	0		-			
Chrysothamnus nauseosus albicaulis																		
M	'83	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'89	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0	
	'97	-	-	-	-	-	1	-	-	-	1	-	-	20	17	41	1	
	'02	-	-	-	-	-	-	-	-	-	-	-	-	0	13	31	0	
D	'83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'89	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	'02	-	1	-	-	-	-	-	-	-	-	-	1	20			1	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>				
		'83				00%				00%				00%				
		'89				00%				00%				00%				
		'97				00%				100%				00%				
		'02				100%				00%				100%				
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	0%			
												'89	0		0%			
												'97	20		0%			
												'02	20		100%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cowania mexicana stansburiana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	89	1	-	-	-	-	-	-	-	-	1	-	-	33			1	
	97	4	-	-	-	-	-	-	-	-	4	-	-	80			4	
	02	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
Y	83	-	1	-	-	-	-	-	-	-	1	-	-	33			1	
	89	-	-	2	-	-	-	-	-	-	2	-	-	66			2	
	97	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	02	1	-	-	-	-	-	-	-	-	1	-	-	20			1	
M	83	-	2	3	-	-	2	-	-	-	2	-	5	233	52	81	7	
	89	-	2	6	-	-	-	-	-	-	8	-	-	266	55	64	8	
	97	-	-	3	-	-	4	-	-	-	7	-	-	140	76	83	7	
	02	-	-	3	-	1	3	3	-	-	10	-	-	200	65	87	10	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	0			0	
	89	-	-	1	-	-	-	-	-	-	1	-	-	33			1	
	97	-	-	1	-	-	1	-	-	-	2	-	-	40			2	
	02	-	-	-	-	-	1	-	-	-	1	-	-	20			1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		38%			63%			63%			+27%							
'89		18%			82%			00%			-51%							
'97		00%			100%			00%			+25%							
'02		08%			58%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	266	Dec:	0%			
												'89	365		9%			
												'97	180		22%			
												'02	240		8%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	15	-	-	-	-	-	-	-	-	-	-	-	-	300		15	
	02	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Y	83	16	-	-	-	-	-	-	-	-	16	-	-	-	533		16	
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100		3	
	97	40	-	-	-	-	-	-	-	-	40	-	-	-	800		40	
	02	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
M	83	11	-	-	-	-	-	-	-	-	11	-	-	-	366	11	14	
	89	19	-	-	-	-	-	-	-	-	19	-	-	-	633	6	5	
	97	98	-	-	-	-	-	-	-	-	98	-	-	-	1960	8	11	
	02	12	-	-	-	-	-	-	-	-	11	1	-	-	240	5	7	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	4	-	-	-	-	-	-	-	-	-	-	3	1	133		4	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	8	1	-	-	-	-	-	-	-	6	-	2	1	180		9	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	520		26	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			- 4%							
'89		00%			00%			15%			+69%							
'97		00%			00%			00%			-79%							
'02		03%			00%			10%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	899	Dec:	0%			
												'89	866		15%			
												'97	2760		0%			
												'02	580		31%			
Purshia tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	02	-	-	3	-	1	-	-	-	-	4	-	-	-	80	38	9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'89		00%			00%			00%										
'97		00%			00%			00%										
'02		40%			60%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	0		-			
												'97	0		-			
												'02	100		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Quercus gambelii																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	1	-	-	-	-	-	-	-	-	-	1	-	-	-	20		1
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20	94	114	1
	02	-	-	-	-	-	-	3	-	-	3	-	-	-	60	65	76	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'89		00%			00%			00%										
'97		00%			00%			00%			+67%							
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	0		-			
												'97	20		-			
												'02	60		-			